



***FINAL***  
**ENVIRONMENTAL ASSESSMENT  
FOR**



**AFRL/RV RESEARCH & DEVELOPMENT ACTIVITIES  
& AREA B LASER TEST AREA**

**WRIGHT-PATTERSON AIR FORCE BASE, OHIO**



**PREPARED BY:**

**88 ABW/CEVY  
ENVIRONMENTAL MANAGEMENT DIVISON  
CIVIL ENGINEER DIRECTORATE  
WRIGHT-PATTERSON AFB**

**OCTOBER 2008**

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**FINDING OF NO SIGNIFICANT IMPACT FOR  
AFRL SENSORS RESEARCH AND DEVELOPMENT ACTIVITIES & AREA B LASER TEST AREA  
WRIGHT-PATTERSON AFB, OHIO**

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Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (40 Code of Federal Regulations [CFR] 1500-1508), Department of Defense Directive 6050.1 and Air Force Regulation 32 CFR Part 989, the 88th Civil Engineer Directorate, Environmental Management Division has prepared an Environmental Assessment (EA) to identify and assess potential effects resulting from the Air Force Research Laboratory (AFRL) Sensors Directorate (RY) research and development activities at Facilities 20620, 20622 and the Area B Laser Test Area (Area B runway) located at Wright-Patterson Air Force Base (WPAFB). This EA is incorporated by reference into this finding.

**Purpose and Need**

The AFRL Sensors Directorate mission is to provide sensor and countermeasure technology enabling complete freedom of air and space operations for the U.S. Air Force. The objective of the Sensors Directorate is to lead the discovery, development, and integration of affordable sensor and countermeasure technologies for the U.S. warfighter. This is performed at WPAFB by conducting research, exploratory and advanced development programs.

**Description of Proposed Action and Alternative**

The proposed action is to perform AFRL sensors research and development activities at Facilities 20620, 20622 and the Area B Laser Test Area. Due to the nature of this research, which involves lasers and other monitoring equipment located at the top floors of Buildings 620 and 622, a clear unobstructed view is required between these facilities and the Laser Test Area. Since there are several research programs developed by AFRL/RD, a description of each program along with the corresponding location is listed in Section II.B. of the EA.

Under the no action alternative, no action would occur. If the no-action alternative was implemented, then the AFRL/RD mission to provide sensor and countermeasure technology would be compromised. This would seriously deter the Sensors Directorate's ability to lead the discovery, development, and integration of affordable sensor and countermeasure technologies for the U.S. warfighter.

**Environmental Consequences**

The proposed action would have minimal or no environmental impacts on the following issues: soils, installation restoration program, environmental justice, transportation, socioeconomics, utility systems, and stored fuels in tanks, therefore these elements were not evaluated in this EA. The no action alternative would have no significant environmental impacts on any natural or manmade resources.

**Air Quality (EA Section IV.B.):** There would be minor, short-term impacts due to particulate matter and engine exhaust emission generated during the firing of the Smokey SAM rocket motors and operation of vehicles.

**Water Resources (EA Section IV.C.):** The proposed action does not impact the surface or ground water resources.

**Natural Resources (EA Section IV.D.):** The areas directly surrounding Facilities 20620, 20622 and the Area B runway are developed and do not contain the habitat of any threatened or endangered species. The land areas between the facilities and the runway do contain several wetlands and potential habitat for the Indiana bat and blazing star stem borer; however the proposed research activities do not occur in these areas. Therefore, the proposed action would have no significant impact on natural resources.

**Cultural Resources (EA Section IV.E.):** The proposed action utilizes two historic properties: Facility 20620 and the Area B triangular runway. The operations of the research activities in and on these properties are consistent with the designed use of the facilities. In accordance with 36 CFR 800.3(a)(1), the WPAFB Cultural Resources Manager has determined that the proposed action does not have the potential to cause effects on these historic properties, therefore, coordination with the State Historic Preservation Officer was not required.

**Hazardous Materials/Hazardous Wastes/IRP (EA Section IV.F.):** There would be potential minor impacts from the use of research quantities of hazardous materials and subsequent generation of hazardous wastes. Impacts would be minimized because hazardous materials and hazardous waste management systems would be in place at these facilities. There would be no impacts to Installation Restoration Program sites.

**Noise/Aircraft Safety (EA Section IV.G.):** There would be short-term minor impacts on ambient noise due to noise from the launching of the Smokey SAM rocket. Impacts would be minimized because these activities would be carried out during normal working hours. The proposed sites are outside all Accident Potential Zones.

**Health and Safety (EA Section IV.H.):** During equipment set-up and the actual research activities, there would be potential impacts on the health and safety of workers. Impacts would be minimized by adherence to health and safety standards. During operation of the Smokey SAM, there would be potential impacts due to the use of rocket propellant. Impacts would be minimized by adherence to the Explosives Site Plan and standard operating instruction. In addition, the Laser Test Area is posted with warning signs, secured by a fence, locked gates, and gate guards during operation.

**Land Use (EA Section IV.I.):** The proposed research activities are consistent with adjacent land use. The proposed action would not impact land use.

**Cumulative Impacts (EA Section IV.J.):** There are no foreseeable, significant, indirect, or cumulative effects associated with the proposed action or no action alternative.

#### **Public Notice**

A public notice was not issued for this EA. In accordance with 32 CFR 989.15, if there is a lack of potential controversy regarding the proposed action a public review is not necessary.

#### **Finding of No Significant Impact (FONSI)**

The proposed action is to perform AFRL sensors research and development activities at Facilities 20620, 20622 and the Area B Laser Test Area. This action is essential to the AFRL mission and the Air Force goal to provide sensor and countermeasure technology enabling complete freedom of air and space operations for the U.S. Air Force. Under the no action alternative, the AFRL/RV mission to provide sensor and countermeasure technology would be compromised. Based upon my review of the facts and analysis contained in the EA, I conclude that the proposed action and the no action alternative will not have a significant impact on the natural or human environment. Accordingly, the requirements of the National Environmental Policy Act, the Council on Environmental Quality Regulations, and 32 CFR 989 have been fulfilled and an environmental impact statement is not required and will not be prepared.



DENNIS R. MATTSON, CFM  
Director  
Civil Engineer Directorate

OCT 06 2008

DATE

*FINAL*

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Appendix A: Site Plan and Photographs

Appendix B: Smokey SAM Explosives Site Plan and AFRL/RV Operating Instruction

## **I. PURPOSE AND NEED FOR ACTION**

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### ***A. Purpose and Need for the Proposed Action***

The Air Force Research Laboratory (AFRL) Sensors Directorate (RY) located at Wright-Patterson Air Force Base (WPAFB) mission is to provide sensor and countermeasure technology enabling complete freedom of air and space operations for the U.S. Air Force. The objective of the Sensors Directorate is to lead the discovery, development, and integration of affordable sensor and countermeasure technologies for the U.S. warfighter. This is performed by conducting the following basic research, exploratory and advanced development programs:

1. Air Force aerospace electro-optical (EO) sensor and countermeasure system needs for air, space and command and control (C2) sensor systems (e.g., optical, infrared and EO surveillance, reconnaissance and targeting from air, space, and ground platforms; and on-/off-board electronic combat).
2. Modeling, simulation, research, design, test, and evaluation of EO subsystems and sensors for use in offensive, defensive and integrated offensive/defensive systems.
3. Radio frequency (RF) sensors programs to meet Air Force Aerospace Global Awareness, Precision Engagement, Survivability, and Life Cycle Cost needs for space, air and ground sensor systems. Leads technology development in radar and electronic warfare sensor systems.
4. Advanced development field and flight test demonstrations of platform specific sensors and of functionally integrated sensor suites for air and space vehicles.
5. Provides risk reduction studies, analyses, simulation, and evaluation of offensive, defensive, navigation/identification and surveillance/reconnaissance sensor technology.

### ***B. Location of the Proposed Action***

Due to the types of research performed and where the research functions are located, there are various locations for the proposed action. The Sensors Directorate is located at Facilities 20620 and 20622 and the Area B Laser Test Area. The Laser Test Area is located on the east-west leg of the former triangular runway. Many of these programs require a large open outside test area which is near Buildings 620 and 622 located in Area B of WPAFB.

### ***C. Decision to be Made***

The purpose of this environmental assessment (EA) is to analyze the environmental impacts of the proposed action and its alternatives (including the no action alternative). Based on the evaluation of this EA, a determination would be made as to whether there are significant environmental impacts expected from the proposed action. The evaluation in this EA would result in a finding of no significant impact (FONSI) if environmental impacts are not significant or in the determination that an environmental impact statement must be prepared if environmental impacts are significant. The decision to be made is whether to permit research and development experiments at the proposed sites or to take no action.

***D. Potential Environmental Impacts***

The proposed action involves conducting various research experiments at Facilities 20620 and 20622 and the Area B Laser Test Area (Area B runway). The proposed action and alternative are evaluated for potential environmental impacts to these elements of the natural and human environment:

- Air quality
- Water resources
- Natural resources
- Cultural resources
- Hazardous Materials/Hazardous Waste
- Noise
- Health and Safety
- Land use

There were no issues related to soils, installation restoration program, environmental justice, transportation, socioeconomics, utility systems, or stored fuels in tanks impacted by this project, therefore these elements were not evaluated in this EA.

***E. Permit Requirements***

No environmental permits are anticipated if the proposed action or the alternative no-action is implemented.



## **II. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES**

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### ***A. Selection Criteria for Site Location***

The criteria used to determine the site location is both based on the research and development requirements and the necessity to have the test area located near Facilities 20620 and 20622. The decision criteria are listed below:

- Outdoor area located near stationary research equipment located in Facilities 20620 and 20622
- Secure outdoor test area
- Area that is least 2500 feet long
- Unobstructed view between test area and Facilities 20620 and 20622

Based upon these selection criteria, the only feasible alternatives considered were the Area B triangular runway (proposed action) and the no-action alternative.

### ***B. Proposed Action: Perform AFRL sensors research and development activities at Facilities 20620, 20622 and the Area B Laser Test Area***

The proposed action is to perform AFRL sensors research and development activities at Facilities 20620, 20622 and the Area B Laser Test Area (Area B runway). Due to the nature of this research which involves lasers and other monitoring equipment located at the top floors of Buildings 620 and 622, a clear unobstructed view is required between these facilities and the Laser Test Area. Since there are several research programs developed by AFRL/RV, a description of each program along with the corresponding location is listed below.

**1. Test Description:** Testing infrared (IR) sources and modulators against IR devices under static and dynamic conditions.

**LOCATION:** Area B, Bldg 620, 10<sup>th</sup> & 12<sup>th</sup> Floors & Trailers, Laser Test Area

**2. Test Description:** A) Laser Port Scatter Experiments- The objective of these experiments is to characterize the special irradiance profile downrange from the laser source as a function of off-axis port scatter contribution. B) Scintillated Laser Experiments- The objective of these experiments is to characterize atmospheric turbulence effects on laser propagation for the purpose of matching turbulence simulations in the laboratory. C) Ultraviolet (UV) and IR Simulator Experiments- The objective of these experiments is to characterize and test custom EO receiver and test equipment for various customers.

**LOCATION:** Area B Laser Test Area/Twin Tower Facility (10<sup>th</sup> Floor)

**3. Test Description:** Facility will be used to demonstrate the ability to simulate the ignition and captured flight of Man Portable Air Defensive Systems (MANPADS) with Dual Thrust Smokey Surface to Air Missile (DTSS) rocket motors. The Smokey Surface to Air Missile (Smokey SAM) motors will be fired singularly, held captive by a moving fixture riding on a 2,000 ft steel cable. The cable will be attached atop an 85 foot mobile tower at one end and at ground level at the other end. Instruments will be located on the field and at the 10<sup>th</sup> floor of the Bldg 620 tower capturing data as the rocket motors are expended. In addition, the motor may be fired in a stationary holder. Smokey SAM testing will average one testing day per quarter, firing up to an average of ten rockets per day, for the next five years.

**LOCATION:** Wright-Patterson Area B Laser Test Area

**4. Test Description:** The Difficult Targets Program is an in-house research project investigating multi-function laser radar techniques and hardware for obscured targets, target and background phenomenology, and signal processing algorithms and systems for target discrimination. The experiments will include laboratory device development and testing, and local range testing. Room 132, is currently being used as a field test support staging area. Assembly of targets and solder station are located here. Room 124 Class 3 & 4 lasers are built up here & fiber optics upstairs is utilized. A fiber cleaver (cutter) incurs possible hazard of glass splinters.

**LOCATION:** Area B, Bldg 622 – 9<sup>th</sup> Floor; Bldg 620 – 11<sup>th</sup> Floor; Laser Test Area – Van

**5. Test Description:** This effort conducts in-house development and evaluation of free space optical communication devices and technologies which include optical pointing systems, optical modems, and optical subassemblies. Contract delivered devices are also tested and experiments and demonstrations are conducted with these devices.

**LOCATION:** WPAFB, Area B, Bldg. 622 – Room 134, 9<sup>th</sup> Floor, Laser Test Area, Truck

**6. Test Description:** LADAR devices will be evaluated to determine their basic functionality and be characterized. Characterization will include laboratory work such as determining optical train point spread functions, detector sensitivity, electrical system responses. Data will be collected during short ranged outdoor experiments from Bldg 622 9<sup>th</sup> floor lab to a target area near Bldg 622 in Area B, and long range sets from the Bldg 622 9<sup>th</sup> floor lab to the laser test area.

**LOCATION:** Area B, Bldg 622 – 9<sup>th</sup> floor and Laser Test Area

**7. Test Description:** LADAR devices will be evaluated to determine their basic functionality and to determine their characteristics. Characterization will include laboratory work, such as determining the point spread functions of the optics and sensor, detector sensitivity, and system response. Data will be collected in the laboratory. Data will also be collected from long range (approx. 1.5 km) outdoor experiments from Bldg. 622, Room 937 laboratory to a target on the Area B Laser Test Area.

**LOCATION:** Area B, Bldg. 622, 9<sup>th</sup> Floor – and Area B Laser Test Area

**8. Test Description:** The FALCON Laser Communications Test will evaluate contractor delivered laser communications hardware via short range tower to ground operations on the Area B test range to and from a SNJM test truck

**LOCATION:** Area B Bldg 622 – 9<sup>th</sup> Floor; Laser Test Area & Van

**9. Test Description:** Maintain, modify and fly remote piloted vehicles with R&D devices for test evaluations.

**LOCATION:** Bldg 620, Room 2BG135, Area B Laser Test Area

**10. Test Description:** The 12<sup>th</sup> Floor is used to test various radars. The radars that occupy the 12<sup>th</sup> floor are usually only here for a short time and are not stored here permanently, as they are used for test purposes. The tower roof area has one permanent test radar which is used under this permit.

**LOCATION:** Area B, Bldg 620 - 12<sup>th</sup> Floor Lab, Tower Roof Area, Laser Test Area

**11. Test Description:** Trailer is used to monitor electronic equipment to support the research effort of the Sensors Directorate. Equipment includes electronic computer equipment.

**LOCATION:** Area B, Laser Test Area, Angel Fire, RV Command Trailer

**12. Test Description:** Facility is used to support the research effort of the Sensors Directorate, Project Avalanche (CRPD). Equipment includes RF communications antenna, camera system, and electronic

equipment. The Avalanche communication system is to be used on west side of tower. All equipment will be attached to a tripod or handheld. Only antenna or transmitter will be use outside of tower. No equipment will be mounted onto the tower or railing.

**LOCATION:** Area B, Bldg 620, Tower Floor 12

**13. Test Description:** Facility is used to support the research effort of the Sensors Directorate, Project BOURNES (CRPD). Equipment includes RF communications antenna, camera system, and electronic equipment. The BOURNES communication system is to be used on the west side of the tower. All equipment will be attached to a tripod or handheld. Only antenna or transmitter will be use outside of tower. No equipment will be mounted onto the tower or railing.

**LOCATION:** Area B, Bldg 620, Tower Floor 12, Laser Test Area

***C. Alternative 1: No-Action Alternative***

Under this alternative, no action would occur. If the no-action alternative was implemented, then the AFRL/RY mission to provide sensor and countermeasure technology would be compromised. This would seriously deter the Sensors Directorate's ability to lead the discovery, development, and integration of affordable sensor and countermeasure technologies for the U.S. warfighter.

### **III. AFFECTED ENVIRONMENT**

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#### ***A. Introduction***

Wright-Patterson AFB is located in the southwest portion of the state of Ohio in Greene and Montgomery counties. The base is subdivided into three areas: A, B, and C. Area B is separated from Areas A and C by State Route (SR) 444 and is more highly developed than other areas of the base. WPAFB is about 10 miles east of Dayton, Ohio, 60 miles northeast of Cincinnati, and 70 miles southwest of Columbus. The base encompasses 8,145 acres with a variety of land uses ranging from administrative and residential to research and industrial. This section of the EA identifies the existing environmental conditions at the proposed locations on WPAFB. These are the conditions that could be affected by the proposed action to conduct sensors research and development activities at Facilities 20620, 20622 and the Area B Laser Test Area.

#### ***B. Air Quality***

The Ohio EPA is responsible for implementing and enforcing the environmental regulatory requirements outlined by USEPA, including monitoring for criteria pollutants (carbon monoxide, nitrogen oxides, sulfur dioxide, lead, ozone, and particulate matter equal to or less than 2.5 microns in diameter) to determine whether the levels meet the criteria pollutant attainment standards. WPAFB is located in the Dayton/Springfield area for ozone National Ambient Air Quality Standards, which covers Clark, Greene, Miami, and Montgomery counties. This area is considered in attainment for the 8-hour ozone standard. However, the Dayton/Springfield area (Clark, Montgomery, and Greene counties) is considered as basic non-attainment for particulate matter less than 2.5 microns in size.

WPAFB, which is considered a major source of air pollutants, submitted an application for a Clean Air Act Title V air quality operating permit in February 1996. Ohio EPA issued a final permit on January 27, 2004, with an effective date of February 17, 2004, identifying all sources of air pollution, applicable regulatory requirements, and emission limits.

#### ***C. Water Resources***

*Surface Water.* Wright-Patterson AFB is located in the Mad River Valley. The Mad River is a tributary for the Great Miami River. Surface drainage from the base is directly into the Mad River or indirectly, through Hebble Creek, Trout Creek, and minor unnamed tributaries. Hebble Creek enters the Mad River at Huffman Dam, in the southwest corner of Area C. The base operates with a National Pollution Discharge Elimination System (NPDES) permit that places limits on pollutants that the base can discharge from its storm drains to navigable waters. Permits are required for discharges of storm water from construction sites. Under the Phase II rule, a Notice of Intent permit is required for disturbance of soil greater than one acre. There is one storm drain located in the middle of the runway in the proposed laser test area.

*Floodplains.* The elevations of Facilities 20620, 20622 and the Area B Laser Test Area (runway) are 968, 947, and 800 - 822 feet above mean sea level (MSL), respectively. These facilities are located downstream of Huffman Dam. Facilities 20620 and 20622 are not located in the 100 year floodplain of

the Mad River (814.3 feet MSL) so there is minimal danger of flooding at these locations. The middle and western portions of the runway are less than 814.3 feet MSL. The 100-year floodplain along the Mad River downstream of Huffman Dam was analyzed as part of the Federal Emergency Management Agency Flood Insurance Study for Montgomery County. The Flood Insurance Rate Map (FIRM) depicting the floodplain along the Mad River near the runway indicates the runway is located in Zone X, which are areas determined to be outside the 0.2% annual chance floodplain. Therefore, the runway is not located in the Mad River floodplain. The FIRM can be found at the following link:

<http://www.mcoho.org/revise/montgomery/services/building/docs/0188E.pdf>

*Groundwater.* The Mad River buried valley aquifer underlies the majority of WPAFB and is part of the larger Miami Valley buried aquifer that supplies drinking water to much of southwestern Ohio. This is an unconsolidated aquifer of glacial origin ranging in thickness from 40 to 300 feet (averaging 50 feet). Valleys created during glaciation in the Pleistocene Epoch were filled by glacial outwash materials consisting primarily of sand and gravel. This aquifer exhibits the relatively high hydraulic conductivity typical for aquifers with this composition (4,000-4,500 gpd/ft). Groundwater is typically found under water table (unconfined) conditions. However, there are intermittent silt strata within the glacial deposits which can act as an aquitard and can produce semi-confined conditions. The floor of the buried valley consists of relatively impermeable Silurian shale bedrock.

#### **D. Natural Resources**

There are a few Ohio threatened/endangered species and federal candidate endangered species located on Wright-Patterson AFB. Federal- and/or state-listed species at WPAFB include the Indiana bat (*Myotis sodalis*), bald eagle (*Haliaeetus leucocephalus*), eastern massasauga rattlesnake (*Sistrurus c. catenatus*), clubshell mussel (*Pleurobema clava*, a mussel), and blazing star stem borer (*Papaipema beeriana*, a moth). A full discussion of threatened and endangered species present or suspected on the base is contained in the Integrated Natural Resources Management Plan (INRMP), available from 88 ABW/CEV, Wright-Patterson AFB, Ohio 45433.

Facilities 20620 and 20622 are constructed buildings surrounded by asphalt parking lots and mowed lawns. The Area B Laser Test Area is located on a concrete runway with flat grassy mowed areas on both sides, which is mowed on a frequent basis throughout the growing season.

As indicated in the INRMP (WPAFB, 2007) the majority of the area between Facilities 20620 and 20622 and the runway has been designated as potentially suitable roosting habitat for the Indiana bat. Mist netting surveys for the Indiana bat were conducted in 2000 and 2007 and no bats were found in Area B. According to the surveys, the woodlands in Area B were found to be of low summer roosting habitat quality for the Indiana bat (CH2M Hill, 2008). According to a June 2008 correspondence from the Ohio Department of Natural Resources, there are no Indiana bat sites in the project area (Shaw, 2008). The area between the facilities and runway also contains two small areas of potential habitat for the blazing star stem borer (WPAFB, 2007). The following identified wetlands also exist between the facilities and runway: B1, B2, B3, B4, B6, B10, B13, B14, B15, B16, and B17 (WPAFB, 2007).

### ***E. Cultural Resources***

Wright-Patterson AFB contains a number of significant cultural resources, including both prehistoric sites and historic buildings and sites. There are two prehistoric sites, consisting of Early Woodland Indian burial mounds, located on base, one single mound in the eastern portion of Area B and a cluster of six mounds within the Wright Brothers Memorial Park. The historic sites include Huffman Prairie Flying Field, a National Historic Landmark, and several historic buildings and districts in Areas A, B, and C. The proposed action utilizes two historic properties: Facility 20620 and the Area B triangular runway.

Facility 20620 was constructed in 1967 as the Electronic Warfare Research Facility and is historically significant due to its role in developing electronic and avionic stealth systems during the Cold War era. The triangular runway constructed as 3 separate legs between 1941 and 1944 served as Wright Field's runway during World War II. The runway, a contributing element of the Wright Field Historic District, is no longer an active runway. However, it is used at times for events, such as remote-controlled aircraft shows, heritage aircraft fly-ins, and the annual WPAFB TATTOO celebration.

### ***F. Hazardous Materials/Hazardous Wastes/Installation Restoration Program***

Hazardous materials are used throughout the base, for research, operational and maintenance activities. WPAFB has a comprehensive hazardous material management program, utilizing a centralized tracking system to control procurement, receipt, labeling, storage, issue, use and final disposal. The hazardous material tracking system allows the base to pre-approve material procurement; minimize the use of hazardous materials and generation of hazardous waste; promote proper safety practices and use of personal protective equipment; provide hazardous material usage data to track chemical exposures to base employees; and report storage, use and emissions data to regulatory agencies. The Hazardous Substance Steering Committee is a network of safety, environmental and logistics experts who work with hazardous material Issue Point Managers (IPMs), Unit Environmental Coordinators (UECs) and other hazardous material users to ensure safe and compliant hazardous material management throughout the base (WPAFB, 2008).

Resource Conservation and Recovery Act (RCRA) hazardous wastes are generated throughout the base from the use of hazardous materials. WPAFB is a large quantity hazardous waste generator and has a comprehensive hazardous waste management program. This program consists of RCRA compliance specialists, RCRA-trained UECs, hazardous waste generators, hazardous waste accumulation and storage areas and a hazardous waste inventory tracking system. There are regular hazardous waste pickups for either temporary storage in the on-site RCRA Part B permitted facility located in Facility 20479 or for shipment off-site to a treatment, storage and disposal facility (WPAFB, 2008a).

The proposed research activities would use research quantities of hazardous materials and generate similar quantities of hazardous wastes. The research activity (#3 in Section II.B.) demonstrating the ability to simulate the ignition and captured flight of Man Portable Air Defensive Systems (MANPADS) utilizes rocket motors. The rocket motors contain approximately 1.1 pounds of propellant and are similar in action as a model rocket engine sold at retail hobby stores. The propellant composition is 44% ammonium perchlorate, 40% zinc powder, 15% binder, and 1% ferric oxide. AFRL/RV has trained IPMs and UECs to properly manage the hazardous materials and all wastes generated from using these materials.

Burial Site 5 is located near the east-west runway within the Laser Test Area. The site was a suspected paint waste site, but no evidence was found of burial or disposal activities during investigations conducted in 1997. An old abandoned underground pipeline, and communication cable running parallel to the runway was discovered, but were considered benign.

While no evidence of disposal activities were noted, some low level volatile organic contamination (PCE) was found in shallow groundwater. Four monitoring wells are still present in the area, which are presently sampled two times a year, and currently proposed for annual sampling. Sampling contractors access the area after coordination with Building 622.

### ***G. Noise/Aircraft Safety***

The Air Installation Compatible Use Zone (AICUZ) program was established by the Air Force in response to Department of Defense requirements to address noise and safety concerns associated with the operation of military installations. The goal of AICUZ is to promote compatible land use on and off base in order to minimize noise complaints and safety hazards. AICUZ guidelines recognize the fact that sounds which are not considered disruptive during daytime hours may be intrusive during the quieter nighttime hours. When measuring sound, this distinction is taken into account by the use of a descriptor known as the day-night average sound level system (DNL or Ldn). The DNL is expressed in decibels (dB) on the A-weighted scale.

In 1995 the base conducted a comprehensive noise survey and established noise level contours for the base and surrounding vicinity. The proposed sites are located in the 65-70 dB noise zone, and the proposed testing activities are not incompatible nor will they significantly increase Wright-Patterson's average noise level. Unified Facilities Criteria 3-260-01, *Airfield and Heliport Planning and Design*, specifies Accident Potential Zones (APZs) extending beyond military runways based upon the statistical possibility of aircraft mishaps. Land use is restricted within the APZ due to safety concerns; however the proposed sites are outside all APZs.

### ***H. Health and Safety***

The primary health and safety issues associated with the proposed research activities include:

- Physical hazards associated with the operation of heavy equipment, vehicles and power tools.
- Hazards associated with hazardous materials, such as solvents and fuels for equipment and vehicles.
- Hazards associated with the operation of lasers.
- Fire and explosion hazards associated with the operation of the Smokey SAM.

The AFRL Safety Office, in addition to the base Environmental Management Division, Safety Office, and Bioenvironmental Engineers have plans in place to address health and safety issues related to these activities. HQ AFMC has approved the Explosives Site Plan for the Smokey SAM firing area and AFRL/RY has developed an operating instruction (OI) specifically for the Smokey SAM operation (see Appendix B). The OI is currently being routed for final approval and signature by AFRL's commander.

## *I. Land Use*

Thirteen distinct, separate land use categories have been identified on Wright-Patterson AFB. Area A of the base consists primarily of administrative functions and medical services, while Area B is devoted chiefly to education, research and development. Area C is dominated by airfield operations and maintenance. Other minor land use categories include housing, outdoor recreation, open space, and industrial. The major land use in the vicinity of the proposed action is research and development.

The National Museum of the United States Air Force (NMUSAF) at times also uses the runway for a landing surface for bringing in aircraft to be displayed in the museum. AFRL/RY employs a scheduler who coordinates all activities at the Laser Test Area.



#### **IV. POTENTIAL ENVIRONMENTAL IMPACTS**

---

##### ***A. Introduction***

The purpose of this section is to provide an evaluation of the potential impacts associated with the proposed action and no-action alternative.

##### ***B. Air Quality***

Impacts on air quality due to research activities for the proposed action would be temporary and insignificant. Small amounts of air pollutants (particulates, carbon dioxide, carbon monoxide) would be generated during the firing of the Smokey SAM rocket motors. Operation of vehicles would result in minor emissions of carbon monoxide, carbon dioxide, nitrogen oxides, and hydrocarbons from the fuels consumed. Emissions from these operations would be expected to be negligible and do not warrant a detailed emissions estimation. In accordance with 40 CFR 93.153(c)(1) a conformity determination is not required. However, this impact would be short-term and the resultant effect on air quality would be minor.

The no-action alternative would have no air quality impact.

##### ***C. Water Resources***

None of the proposed research activities would physically impact the ground and therefore would have no impacts to the surface or ground waters. In addition, there would be no impacts to the floodplain as the proposed facilities are located outside the Mad River 100-year floodplain area.

The no-action alternative would have no impact on surface or ground water quality or quantity.

##### ***D. Natural Resources***

The areas directly surrounding Facilities 20620, 20622 and the Area B runway are developed and do not contain the habitat of any threatened or endangered species. The land areas between the facilities and the runway do contain several wetlands and potential habitat for the Indiana bat and blazing star stem borer, however the proposed research activities do not occur in these areas. Therefore, the proposed action would have no significant impact on natural resources.

The no action alternative would have no impact on natural resources.

##### ***E. Cultural Resources***

The proposed action utilizes two historic properties: Facility 20620 and the Area B triangular runway. The operations of the research activities in and on these properties are consistent with the designed use of the facilities. In accordance with 36 CFR 800.3(a)(1), the WPAFB Cultural Resources Manager has determined that the proposed action does not have the potential to cause effects on these historic

properties. Therefore, Section 106 coordination with the State Historic Preservation Officer is not required.

The no action alternative would have no impact on cultural resources.

#### ***F. Hazardous Materials/Hazardous Wastes/Installation Restoration Program***

The proposed action would utilize hazardous materials. Potential impacts would be minimized because existing hazardous material management, waste management, and emergency management programs and systems would be applicable to AFRL research activities. In addition to these existing systems, AFRL standard operating procedures would promote best management practices and prevent or mitigate releases of hazardous materials, waste and stored fuels. With regards to the Smokey SAM operation, the rocket motors are considered explosive materials and stored in the base weapons storage area. The rocket motors will be transported in sealed containers by explosive ordnance trained personnel. Any unspent rocket motors will be handled by 88 ABW Explosive Ordnance Disposal (EOD) personnel for proper disposal. Therefore, the proposed action would have a minor insignificant impact on the use of hazardous materials and the generation of hazardous wastes. There is no impact from the proposed action on the Installation Restoration Program (IRP) Burial Site 5 which is located near the east-west runway within the Laser Test Area.

The no action alternative would have no impact on hazardous materials, hazardous wastes or IRP sites.

#### ***G. Noise/Aircraft Safety***

A minor increase in noise would result from the Smokey SAM rocket launches. Due to the infrequent launch schedule (one day/quarter) this noise represents a short-term impact on ambient noise levels. All other proposed research activities would be considered normal with the existing day-to-day operations in Area B. Unified Facilities Criteria 3-260-01, *Airfield and Heliport Planning and Design*, specifies Accident Potential Zones (APZs) extending beyond military runways based upon the statistical possibility of aircraft mishaps. Land use is restricted within the APZ due to safety concerns; however the proposed sites are outside all APZs. Therefore, the proposed action would have a minor insignificant impact on noise and aircraft APZs.

The no-action alternative would have no impact on noise and aircraft APZs.

#### ***H. Health and Safety***

Employees conducting the research and development activities would be responsible for complying with the Explosives Site Plan and operating instruction for the Smokey SAM operation, base standard operating procedures for the other respective research activities, and applicable health and safety regulations. Access to the runway is secured by a fence, posted warning signs, locked gate, and gate guards during the research activities at the Laser Test Area. Therefore, the potential negative impacts to health and safety would be significantly minimized, by adherence to safety plans and operational procedures.

The no-action alternative would have no impact on health and safety.

### ***I. Land Use***

The proposed research activities are consistent with adjacent land use. The proposed action is consistent with long-term base land use plans. The AFRL/RV scheduler would ensure all land use activities, i.e. NMUSAF, Civil Engineering, and other events, are properly scheduled and coordinated with the AFRL research activities at the Area B Laser Test Area and runway. Therefore, the proposed action would have no impact to land use.

The no-action alternative would have no impact on land use.

### ***J. Cumulative Impacts***

A cumulative effect is defined as an effect on the environment that results from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place locally or regionally over a period of time. The purpose of analyzing the cumulative effects of a proposed action is to ensure that federal decisions consider the “big picture” of the consequences of the proposed action.

Cumulative effects are identified by defining the direct and indirect effects of the proposed action, determining which environmental resources are affected, and deciding which effects on these resources are important from a cumulative effects perspective. Also, when analyzing cumulative effects, the spatial (geographical area) and temporal (time frame) components must be expanded beyond the scope of the proposed action.

There are no foreseeable, significant, indirect, or cumulative effects associated with the proposed action or no action alternative.

### ***K. Unavoidable Adverse Impacts***

Minor impacts from noise may slightly affect passers-by and nearby workers. The increase in noise would be primarily due to the rocket launches of the Smokey SAM. The noise would only exist during working hours.

### ***L. Relationships of Short-Term Uses and Long-Term Productivity***

Neither the proposed action nor the no-action alternative would affect the long-term productivity of the environment; no significant impacts to the environment or socioeconomic factors have been identified through this EA process.

### ***M. Irreversible and Irretrievable Commitments of Resources***

CEQ regulations in 40 CFR §1502.16 require that an agency identify any irreversible or irretrievable commitments of resources that would be involved in the proposed action, should it be implemented.

Capital, energy, materials, and labor would be required for the proposed action. These resources are not retrievable.

## V. CONCLUSION

The results of this EA indicate that the proposed action, perform AFRL sensors research and development activities, would have no significant environmental impacts. Based on this study, the preparation of an environmental impact statement is not warranted. It is recommended that a finding of no significant impact be issued. The evaluation of the potential environmental impacts from the proposed action and no-action alternative is summarized in Table 1.

**Table 1.** Summary of Potential Environmental Impacts

<b>Resource</b>	<b>Environmental Impacts Proposed Action</b>	<b>Environmental Impacts No-Action</b>
Air	<u>Short-term:</u> Minor impacts from Smokey SAM activities.  <u>Long-term:</u> No impacts	<u>Short-term:</u> No impacts  <u>Long-term:</u> No impacts
Water Resources	<u>Short-term:</u> No impacts  <u>Long-term:</u> No impacts	<u>Short-term:</u> No impacts  <u>Long-term:</u> No impacts
Natural Resources	<u>Short-term:</u> No impacts  <u>Long-term:</u> No impacts	<u>Short-term:</u> No impacts  <u>Long-term:</u> No impacts
Cultural Resources	<u>Short-term:</u> No impacts  <u>Long-term:</u> No impacts	<u>Short-term:</u> No impacts  <u>Long-term:</u> No impacts
Hazardous Materials/Hazardous Wastes/IRP	<u>Short-term:</u> Minor impacts from use of hazardous material and generation of wastes.  <u>Long-term:</u> Minor impacts from use of hazardous material and generation of wastes.	<u>Short-term:</u> No impacts  <u>Long-term:</u> No impacts
Noise	<u>Short-term:</u> Minor impacts  <u>Long-term:</u> No impacts	<u>Short-term:</u> No impacts  <u>Long-term:</u> No impacts
Health and Safety	<u>Short-term:</u> Potential insignificant impacts, mitigated by adherence to safety site plans & operational instructions  <u>Long-term:</u> Potential insignificant impacts, mitigated by adherence to safety site plans & operational instructions	<u>Short-term:</u> No impacts  <u>Long-term:</u> No impacts
Land Use	<u>Short-term:</u> No impacts  <u>Long-term:</u> No impacts	<u>Short-term:</u> No impacts  <u>Long-term:</u> No impacts

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## **VI. PERSONS CONTACTED**

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Russ Scherer, Unit Environmental Coordinator, AFRL/RD  
Terry Garrison, Systems Safety, AFMC Det 1 AFRL/SE  
Mary Bortz, Environmental/Safety Contractor Support, AFRL/RD  
Jo Anderson, AICUZ Manager, 88 ABW/CECX  
Anthony Lee, Community Planner, 88 ABW/CECX  
David Duell, Air Quality Program Manager, 88 ABW/CEVY  
Sherm Siegal, IRP Manager, 88 ABW/CEVO

### **References:**

Wright-Patterson Air Force Base (WPAFB), 2007. *Integrated Natural Resources Management Plan*, February 2007.

CH2M Hill, 2008. *Environmental Assessment for BRAC Facilities and Remote Field Training Site*, Wright-Patterson Air Force Base, 88 Air Base Wing Environmental Management Division, March 2008.

Shaw Environmental, Inc. (Shaw), 2008. *Environmental Assessment for Assured Aerospace Fuels Research Facility*, Wright-Patterson Air Force Base, 88 Air Base Wing Environmental Management Division, September 2008.

Wright-Patterson Air Force Base (WPAFB), 2008. *Installation HAZMAT Management Program Plan*, July 2008.

Wright-Patterson Air Force Base (WPAFB), 2008a. *Hazardous Waste Management Plan*, April 2008.

### **Prepared By:**

Raymond Baker  
MS, Environmental Management, Certified Hazardous Materials Manager  
Chief, Quality Branch  
EIAP/Cultural Resources Manager  
88 ABW/CEVY  
Environmental Management Division  
Wright-Patterson Air Force Base

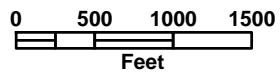
## **APPENDIX A: SITE PLAN AND PHOTOGRAPHS**



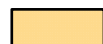


**WRIGHT-PATTERSON AIR FORCE BASE, OH 88 ABW/CEV ENVIRONMENTAL MANAGEMENT FOR OFFICIAL USE ONLY**

Legend



BLAZING STAR STEM BORER POTENTIAL HABITAT



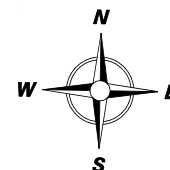
INDIANA BAT POTENTIAL HABITAT



IRP MONITORING WELLS



WETLAND AREA







Area B Runway (Laser Test Area), Looking West



Area B Runway, Looking Northwest Towards NMUSAF





Area B Runway, Looking Southeast Towards I-675



Area B Runway, Looking East Towards Facility 20620 Tower





Area B Runway, Looking North Towards Downtown Area B



Area B Runway, Looking South Towards Colonel Glenn Highway

**APPENDIX B: SMOKEY SAM EXPLOSIVES SITE PLAN & AFRL/RV OI**



**DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD  
2461 EISENHOWER AVENUE  
ALEXANDRIA, VIRGINIA 22331-0600**

**AUG 25 2008**

DDESB-PE

MEMORANDUM FOR HEADQUARTERS AIR FORCE SAFETY CENTER  
(ATTENTION: SEW)

SUBJECT: DDESB Final Approval of Request for Routine Processing and Final Approval of Explosives Site Plan (ESP) AFMC-Wright-Patterson-07-S002, Smokey SAM Simulator Firing Area, Facility 23007, Wright-Patterson AFB, OH

References: (a) HQ AFSC/SEW Memorandum of 31 July 2008, Subject: Request for Routine Processing and Final Approval of Explosives Site Plan (ESP) AFMC-Wright-Patterson-07-S002, Smokey SAM Simulator Firing Area, Facility 23007, Wright-Patterson AFB, OH

(b) DoD 6055.09-STD, DoD Ammunition and Explosives Safety Standards, 29 February 2008

The subject site plan, forwarded by reference (a), has been reviewed with respect to the explosives safety requirements of reference (b). Based on the information furnished, final explosives safety site approval is granted for a Smokey Surface to Air Missile (SAM) firing area at Wright-Patterson AFB, Ohio. This approval is based on the following:

a. Facility 23007 is approved for up to 35 pounds (lbs) net explosive weight for quantity-distance (NEWQD) of Hazard Division (HD) 1.3; and up to 2 lbs NEWQD of HD 1.4. The inhabited building distance (IBD) is 300 feet, based on paragraph 3.27.3.1 of AFMAN 91-201. The public traffic route distance (PTRD) is 75 ft, based on the HD 1.3.

b. Per reference (a):

(1) Unused explosives stocks will be stored in approved magazines at the end of each test day.

(2) The runways and taxiways within IBD are abandoned.

(3) A lightning protection system is not installed. A local lightning warning system is in use, operations will be terminated and personnel will be evacuated to at least PTRD at the approach of an electrical storm, and the responsible commander has accepted the risk of loss or damage associated with a lightning strike; thus the requirements of paragraph C7.4.1 of reference (b) are met.


(4) There are no electromagnetic radiation hazards to this location.



(5) There are no occupied facilities with glass panels within the IBD arc.

A copy of the complete site plan package and this approval letter must be maintained as a permanent record at the installation of origin. Master planning documents and installation drawings must be updated to reflect this site plan.

Point of contact is Mr. Jarrett Beard at commercial: (703) 325-3514; DSN: 221-3514; or E-mail: Jarrett.Bear@ddesb.osd.mil.

  
CURTIS M. BOWLING  
Chairman  
DDESB



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS AIR FORCE SAFETY CENTER

MEMORANDUM FOR DDESB-PE

FROM: HQ AFSC/SEW  
9700 G Avenue, Suite 130  
Kirtland AFB, NM 87117-5670

SUBJECT: Request for **Routine** Processing and Final Approval of Explosives Site Plan (ESP) AFMC-Wright-Patterson-07-S002, Smokey SAM Simulator Firing Area, Facility 23007, Wright-Patterson AFB, OH

Subject site plan has been evaluated for compliance with ammunition and explosives safety standards and is submitted for further review and final approval. The following information is provided for analysis purposes.

- a. ESPs 07-S002 sites facility 23007 as a smokey SAM simulator firing area. The requested net explosive weights are 35 lbs Hazard Class/Division (HC/D) 1.3 and 2 lbs HC/D 1.4. Facility will support day-to-day testing operations.
- b. The attached AF Form 943 and map document all paired potential explosives site and exposed site relationships within the Inhabited Building Distance (IBD) clear zone. The IBD clear zone of 300 feet is based on criteria in AFMAN 91-201, paragraph 3.27.3, Static Test Firing Propellant Loaded Items. The subject site plans has been coordinated with the base comprehensive plan.
- c. There are no facilities within IBD with glass panes, therefore a glass breakage assessment is not required.
- d. There are no electro-magnetic radiation hazards to munitions at the subject ESP being sited.
- e. The evaluation zone of 1,429 feet was used based on 500,000 lbs HC/D 1.1 at K18.
- f. A Lightning Protection Systems (LPS) is not installed. Due to area size installation of LPS is not feasible. In the event of lightning within 5 nautical miles of the base, operations will cease and all personnel will evacuate to a distance at least 100 feet or greater from all explosives.
- g. Per AFMC/SEW guidance the 5% Mg developmental smokey SAM rocket motor will not be used until the interim hazard classification is updated or the final hazard classification is approved.

h. All explosives quantity distance criteria have been met without exceptions or compensatory measures.

This office concurs with subject request as submitted and recommends final approval. Please contact Mr. William Curtis, contractor, HQ AFSC/SEWCV, at DSN 246-1398 or Email: [william.curtis@kirtland.af.mil](mailto:william.curtis@kirtland.af.mil), if you have any questions.

ALBERT V. WEBB, YA-03  
Chief, Explosive Site Planning Branch



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS AIR FORCE MATERIEL COMMAND  
WRIGHT-PATTERSON AIR FORCE BASE OHIO

3 Mar 08

MEMORANDUM FOR HQ AFSC/SEW

FROM: HQ AFMC/SEW  
4375 Chidlaw Rd.  
Wright-Patterson AFB, OH 45433-5006

SUBJECT: Request Final Explosives Site Plan Approval, AFMC-Wright-Patterson 07-S02

1. Request routine processing of subject explosives site plan (ESP) for final approval by the Department of Defense Explosives Safety Board. ESP has been reviewed for compliance with explosives safety standards and is submitted for your review.
2. ESP was produced using Assessment System for Hazard Surveys II (ASHS) software, Version 2459, Database 53. All explosives safety quantity-distance criteria are met.
3. We agree the Smokey Sam Simulator Static Firing Area does not require a lightning protection system. Rationale is explained in paragraph 7 of the 88 ABW/CC Memorandum.
4. The interim hazard classification for Developmental 5-percent MG Smokey SAM Rocket Motor is included with the ESP submission.
5. Safety requirements of Technical Order 11L1-2-23-1, *Smokey Sam Simulator/Antiaircraft Artillery Visual Cueing System*, will be adhered to as well as the provisions of AFMAN 91-201, *Explosives Safety Standards*, paragraph 3.27.3.
6. HQ AFMC/SEW has reviewed and approves the subject ESP. Direct questions concerning the ESP to me at DSN 787-6128 or E-mail at Richard.Hanke@wpafb.af.mil.

A handwritten signature in black ink, reading "Richard D. Hanke", is positioned above the printed name.

RICHARD D. HANKE, Civ, USAF  
HQ AFMC Weapons Safety Manager

Attachment:  
Explosives Site Plan, AFMC-Wright-Patterson 07-S02



**DEPARTMENT OF THE AIR FORCE**  
HEADQUARTERS, 88<sup>th</sup> AIR BASE WING (AFMC)  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

18 JAN 2008


MEMORANDUM FOR HQ AFMC/SEW

FROM: 88 ABW/CC

SUBJECT: Final Explosives Site Plan Request, Static Missile Test Stand, Facility 23007, Smokey Sam Simulator Static Firing Area, Wright Patterson AFB, Ohio (AFMC-Wright-Patterson 07-S2)

1. Request routine processing and final Department of Defense Explosives Safety Board approval of the subject Explosives Site Plan (ESP) for the purpose of siting a Smokey Sam Simulator Static Firing Area. Approval of this ESP will enable the Air Force Research Laboratory (AFRL) to conduct testing of missile countermeasure systems.
2. This ESP is submitted for processing in accordance with AFMAN 91-201, *Explosives Safety Standards*, 18 Oct 01. There is no construction involved with this submission package.
3. Headquarters Air Force Material Command (HQ AFMC) approval is requested no later than 31 Jan 08 to prevent unnecessary delays in testing countermeasure systems. This ESP will be implemented upon receiving HQ AFMC approval as authorized in AFMAN 91-201, Paragraph 4.3.5.
4. The requested Net Explosives Weight for Quantity-Distance (NEWQD) is 35 pounds Hazard Division (HD) 1.3; and two pounds of HD 1.4 explosives.
5. This submission contains an AF Form 943 and map which illustrate Potential Explosion Sites (PES) and Exposed Site (ES) relationships. The map depicts a 300 foot explosives clear zone based on Inhabited Building Distance (IBD) for Air Force static test firing of propellant loaded items. All exposed sites within IBD of the operating location are explained on the AF Form 943. The evaluation zone is 1,429 feet (500,000 pounds NEWQD @ K18).
6. The exact location of the operating location/test site will vary, but will remain within the PES footprint illustrated in the attached ESP package. The daily-use ready explosives stocks, directly supporting this operation, will also vary but will be located within the illustrated PES footprint at least 100 feet from the explosives operating location/test site, related vehicles and powered support equipment. At least 50 feet of separation will be maintained between daily-use ready explosives stocks and all other related exposures. Unused explosives stocks will be stored in an approved magazine at the end of each test day.
7. All explosives safety criterion are met; however, this test area is not equipped with a Lightning Protection System (LPS). Installation of a LPS is not feasible or practical based on the very limited quantities of HD 1.3 and 1.4 explosives. Explosives operations will not be conducted at this test area when the local lightning warning system indicates lightning is within five nautical miles. If lightning unexpectedly moves within five nautical miles of this location during testing, local procedures will be implemented to evacuate personnel to a distance of at least 100 feet or greater from all explosives. Personnel are not expected to sustain injury and at the same time, the resulting economic loss is minimal. The AFRL Wright Research Site Commander (AFRL WRS/CC) understands and accepts the potential loss of AFRL equipment, resources and explosives as indicated in the cover memorandum contained in the attached ESP package. I understand and accept the potential loss of 88<sup>th</sup> Air Base Wing (88 ABW) resources at this location and any potential collateral damage to other nearby exposures in the event of a lightning strike.

8. The explosive clear zone was evaluated for utilities. There are no utilities requiring quantity-distance separation.
9. The explosives clear zone has been reconciled with the base comprehensive plan. The explosives clear zone does not exceed the base boundary.
10. Implementation of this site plan will not adversely affect operations currently conducted in the area. Personnel and explosives limits will be controlled by operating instructions and held to a minimum commensurate with safe and efficient operations. This ESP is maintained by the installation weapons safety office for oversight. A copy of the approved ESP will be provided to the user to ensure compliance.
11. The AFRL WRS/CC cover memorandum contains additional information pertaining to this ESP request.
12. My point of contact for this matter is Mr. Randy Russell, 88 ABW/SEW, at DSN 674-0487 or E-mail: Randy.Russell@wpafb.af.mil.

  
COLLEEN M. RYAN  
Colonel, USAF  
Commander

Attachment:  
ESP Package, AFMC-Wright-Patterson 07-S2





DEPARTMENT OF THE AIR FORCE  
AIR FORCE RESEARCH LABORATORY  
WRIGHT-PATTERSON AIR FORCE BASE OHIO

05 NOV 2007

MEMORANDUM FOR ASC/SE

FROM: AFRL WRS/CC  
2130 8th St.  
Wright-Patterson AFB OH 45433

SUBJECT: Final Explosives Site Plan Request, Static Missile Test Stand, Facility 23007, Smokey Sam Simulator Static Firing Area, Wright Patterson AFB, Ohio (AFMC-Wright-Patterson 07-S2)

1. Request routine processing and final approval of subject explosives site plan (ESP) for the purpose of siting a Smokey Sam Simulator Static Firing Area. Approval of this ESP will allow AFRL/RV to conduct testing of missile countermeasure systems.

2. This ESP package is submitted for processing in accordance with AFMAN 91-201, Explosive Safety Standards, 18 Oct 01. It does not expose assigned/tenant units. There is no lightning protection system (LPS) for this area and none are proposed in the future. Procedures will be implemented through operating instructions (OI) to evacuate all personnel when the local lightning warning system indicates lightning is within five nautical miles of the installation. This evacuation distance will be  $\geq$  to public traffic route (PTR) protection from explosives. I accept the potential loss of resources, explosives, and potential collateral damage associated with the increased risk posed by lightning. All other explosive safety criteria will be met.

3. This submission contains a potential explosion site (PES)/exposed site (ES) Map, and AF Form 943 which show PES and ES relationships. The map depicts a 300 foot clear zone for inhabited building distance (IBD) and a 1,429 foot evaluation zone (EZ). All applicable ESs and PESs within these zones are explained on the AF Form 943.

4. The following information is included to assist in the ESP process:

a. A Smokey Sam Simulator consists of one of two versions of a GTR-18 rocket with a PVU-3 igniter. A rocket is less than 16" long and weighs less than 3 pounds. (See Attachment 4).

b. The explosives authorizations for this ESP will be 35 pounds of hazard division (HD) 1.3 and 2 pounds of HD 1.4. Each Smokey Sam Rocket, depending on version, has up to 1.4 pounds of HC/D 1.3 explosive material and come in standard packs of 12 each. There is one initiator per rocket and it contains less than 1 ounce of HC/D 1.4 explosive material.

c. A 1,429 ft. EZ was used to identify other PESs that may hazard this site; there are no other PES's within the EZ. A 300 ft. minimum IBD was established based on guidance found in AFMAN 91-201 table 3.3 note 31 and paragraph 3.27.3. Personnel and ready explosives directly related to this operation must be located at least 100 feet from Smokey Sam Rockets being fired as required in technical order (TO) 11L1-2-23-1 (See Attachment 5).

d. The proposed sited area is located on a closed airfield. This location is not located within any airfield explosives prohibited zones.

0 5 NOV 2007

e. ESP is for the use of Smokey Sams to provide an infrared (IR) source. This IR source will be used to determine the effectiveness of queuing IR sensors developed for missile countermeasure systems.

f. The ESP area is sized to accommodate static firings at multiple distances and tethered flight along a 1,600 ft. steel cable. The entire cable will be located within the PES footprint illustrated on the attached ESP map. There will be no free flight of simulators; therefore no FAA clearance is required.

g. The ESP area is surrounded by a fence which guarantees limited access to people unrelated to operations being conducted.

h. No glass breakage risk assessment was performed since no occupied facilities are within the explosives clear zone.

i. There are no roads within the evaluation zone.

j. Electro-Magnetic Radiation (EMR) hazards were evaluated. Our analysis shows no EMR hazards to the purposed area being sited.

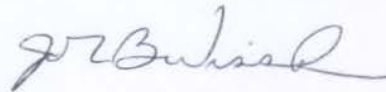
k. No buildings or new construction are involved with this ESP.

5. The base map will be updated upon final approval of the site plan. The explosives clear zone does not exceed the base boundary.

6. We have reviewed our records and cannot identify any prior site plan approval for this area. Upon approval, this submission will supersede all previous records that may be on file.

7. Implementation of this site plan will not adversely affect operations currently conducted in the area. Personnel and explosives limits will be controlled by operating instructions and held to a minimum commensurate with safe and efficient operations. An approved copy of this ESP package will be maintained by 88ABW/SEW for oversight and a copy will be provided to the user to ensure compliance.

8. My point of contact is MSgt Kevin Benda, AFRL/SEW at DSN 986-6924 or by E-mail: kevin.benda@wpafb.af.mil.

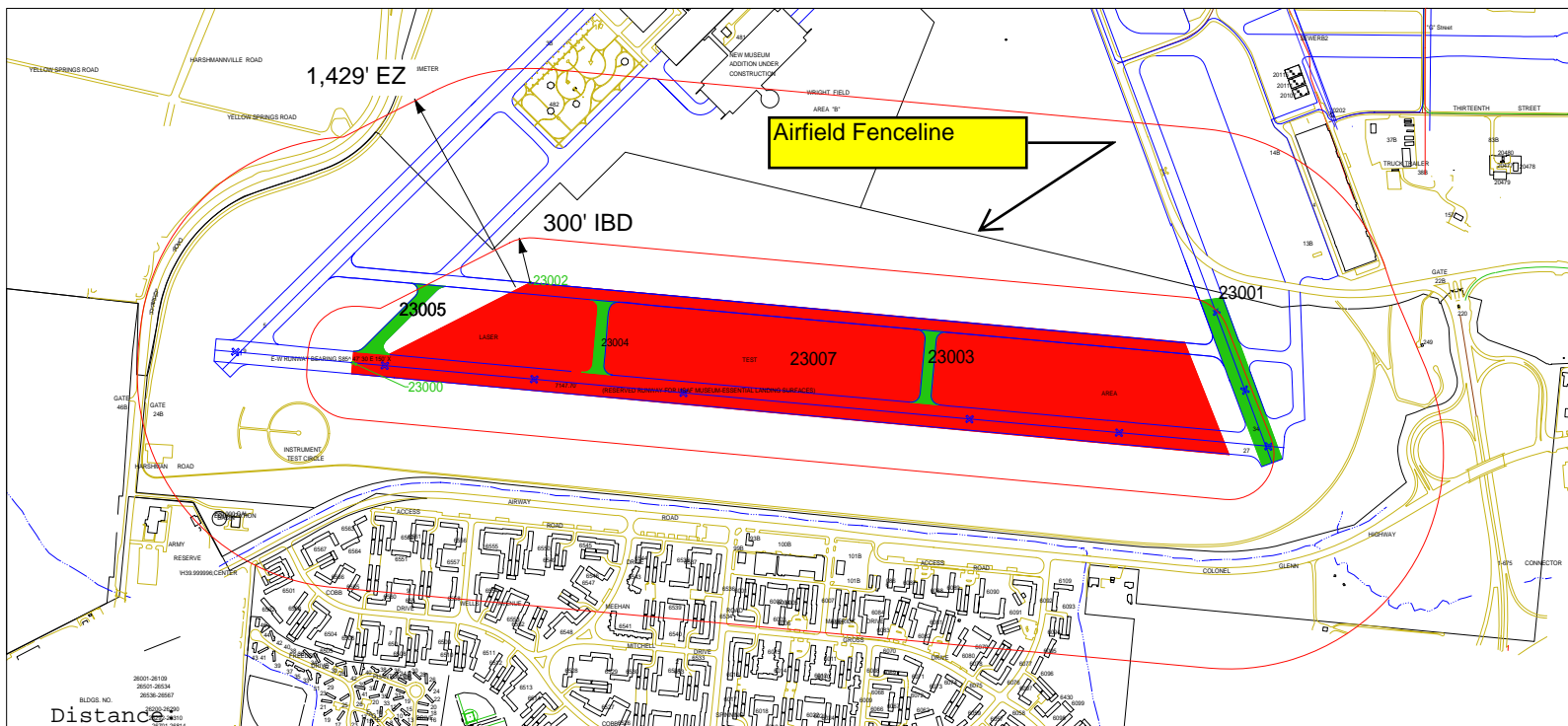


JOHN B. WISSLER, Col, USAF  
Materiel Group Director, Air Vehicles  
Wright Research Site Commander

Attachments:

1. ESP Map
2. AF Form 943
3. Rocket Retention documentation
4. Cutaway and Picture of GTR-18 Rocket
5. Excerpt from TO 11L1-2-23-1





WRIGHT-PATTERSON AFB, OHIO EXPLOSIVES SITE PLAN  
 AFMC-Wright-Patterson AFB-07S-2  
 SMOKEY SAM STATIC AREA

EXPLOSIVES SITE PLAN									
SECTION I - GENERAL INFORMATION									
ACTION NUMBER AFMC-Wright-Patterson AFB-07-S2				BASE/LOCATION Wright-Patterson AFB, Ohio				DATE Aug 31, 2007	
SECTION II - SITE DATA									
SITE INFORMATION									
FAC NO. 1	FACILITY/OPERATION DESCRIPTION 2	OWNING MAJCOM/UNIT 3	NO. OF PEOPLE 4	SITED NEWQD 5	(xx) HC/D MCE/LSRN 6	REMARKS 7			
23007	Static Missile Test Stand SMOKEY SAM STATIC AREA	AFMC-AFRL DET 1	5M 0C	None None None None 35 2	1.1 1.2.1 1.2.2 1.2.3 1.3 1.4	IBD Established using AFMAN 91-201, Paragraph 3.27.3.1.			
SECTION III - PES/ES Q-D PAIRED RELATIONSHIPS WITH FACILITY/LOCATION BEING SITED									
FAC NO. 1	FACILITY/OPERATION DESCRIPTION 2	OWNING MAJCOM/UNIT 3	NO. OF PEOPLE 4	SITED NEWQD 5	(xx) HC/D MCE/LSRN 6	DIST ACT 7	DIST RQD 8	SEP FACTOR Col/Line/Note 9	REMARKS 10
23005	Abandoned Facility TAXIWAY B	AFMC-88 ABW	0M 0C	None	None	0'	0	(72)	
23002	Abandoned Facility TAXIWAY E	AFMC-88 ABW	0M 0C	None	None	0'	0	(72)	
23000	Abandoned Facility RUNWAY 09-27	AFMC-88 ABW	0M 0C	None	None	0'	0	(72)	
23004	Abandoned Facility TAXIWAY C	AFMC-88 ABW	0M 0C	None	None	0'	0	(72)	
23003	Abandoned Facility TAXIWAY D	AFMC-88 ABW	0M 0C	None	None	0'	0	(72)	
23001	Abandoned Facility RUNWAY 16-34	AFMC-88 ABW	0M 0C	None	None	261'	0	(72)	

### **Trolley Assembly Strength Analysis**

The enclosed is a structural strength analysis of the AFRL/SN device designed to constrain the Navy developed “Smokey Sam”.

The “Smokey Sam” was developed by Naval Weapons Center (NWC) as an extremely simple and cheap surface-to-air missile (SAM) simulation rocket (see Picture 1). It was to provide a realistic visual SAM threat in air warfare exercises by actually launching a rocket without endangering the "attacked" aircraft. The rocket was designated “GTR-18A”, and because it trails a highly visible thick white cloud of smoke when fired to simulate a SAM, it was called "*Smokey Sam*". The GTR-18A rocket is a very simple rocket with a fuselage made of phenolic paper and styrofoam fins. Because of its very light construction, the *Smokey Sam* won't do serious harm even if it accidentally hits a low-flying aircraft. In the early 1990s the *Smokey Sam* rocket was redesignated as DGTR-18A, although the use of the D ("Dummy") prefix is usually limited to non-flying rockets/missiles used for ground handling training only.



Picture 1: Smoke Sam Free Launch – Not Utilized in this Manner at WPAFB

Physical characteristics of the “Smokey Sam” are shown in Table 1 – this was taken from the NAVAIR Technical Order – Operational, Organizational and Intermediate Maintenance Instructions with Illustrated Parts Breakdown, NAVAIR 11-75-63, 14 Nov 1989, Data Change 1 Mar 1991.

<u>Length</u>	<u>Inches</u>	<u>(cm)</u>
Overall	15.3	(38.9)
Fin	6.0	(15.2)
Nose Cone	1.3	( 3.3)
Rocket Grain	11.0	(27.9)
<u>Diameter</u>		
Tube		
Outside	2.09	( 5.3)
Inside	2.00	( 5.1)
Fin, maximum	6.00	(15.2)
Rocket Grain		
Outside	2.00	( 5.1)
Inside	1.56	( 4.0)
<u>Weight</u>	<u>Pounds</u>	<u>(kg)</u>
Total	1.53	( 0.694)
Rocket Grain	1.1	( 0.499)
<u>Rocket Grain (Propellant)</u>	<u>Percentage</u>	
Composition		
Ammonium Perchlorate	44	
Zinc Powder	40	
Ferric Oxide	1	
Binder	15	

AFRL/SN utilizes the “Smokey Sam” to simulate the launch of a Surface to Air Missile (SAM) and Man Portable Air Defense System (MANPADS) and evaluate sensor technologies to defeat the threat posed by these weapons. The test associated does not involve a free flight of the missile, but testing is accomplished by either of the following two methods.

- Method 1 – “Smokey Sam” is constrained in a fixture that does not allow for the “Smokey Sam” to move. The fixture is more heavily built than the “Trolley Assembly” and therefore was not formally evaluated for strength.
- Method 2 – “Smokey Sam” is attached to the Trolley Assembly allowing for the “Smokey Sam” to ride a cable to simulate flight while remaining constrained. The cable is strung from launcher to top of 85 foot mobile tower elevating the cable approximately 80 feet above the ground. The evaluation of the Trolley Assembly shown in Figure 2 is necessary to determine if proper design factor of safety have been allowed for – 200% Design Factor of Safety:

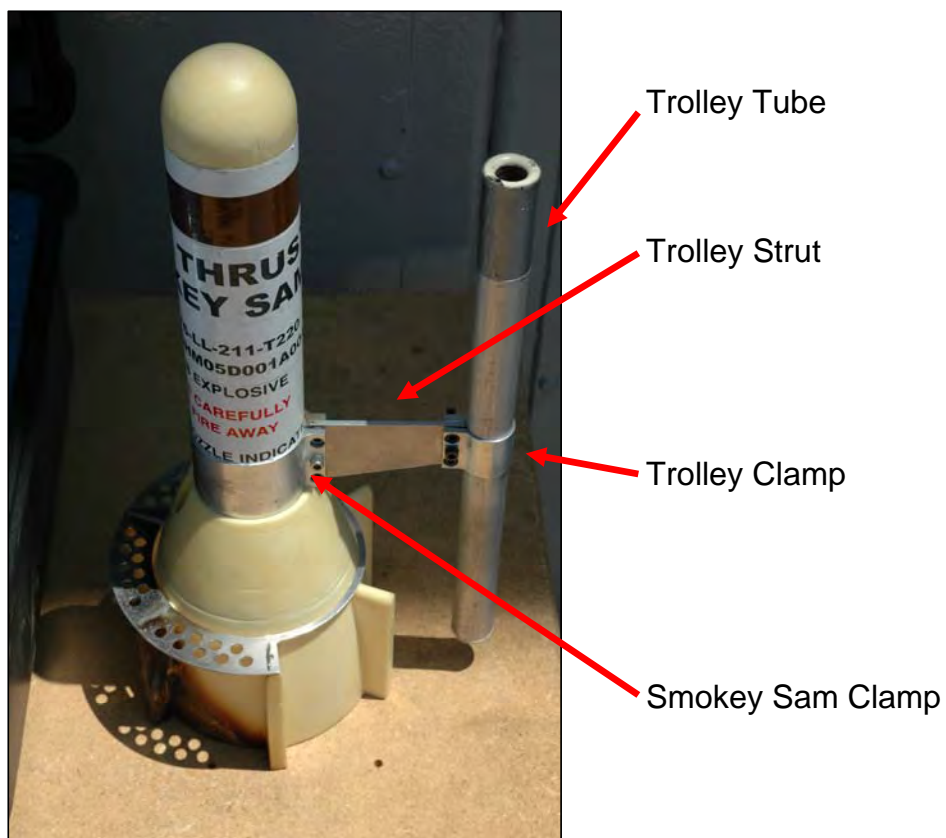
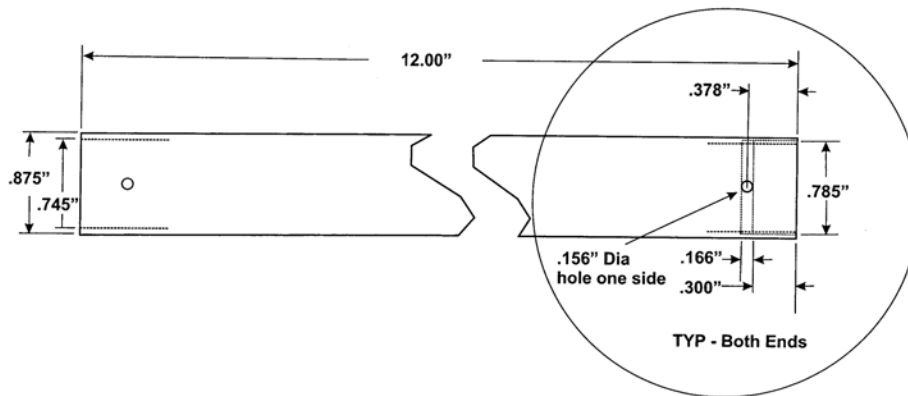


Figure 2: Trolley Tube Smokey Sam Trolley Assembly – Parts Identified

## Smokey Sam Trolley Tube



Matl: 6016 - T6 Alum Tubing  
 7/8"OD x .065"wall  
 Dan Beasley  
 3/26/04

Aluminum Alloy Designation	Temper	Yield Strength (1,000 lbs/sq in)	Tensile Strength (1,000 lbs/sq in)
6061	T6	40	45

Marks's Standard Handbook for Mechanical Engineers – Eighth Edition

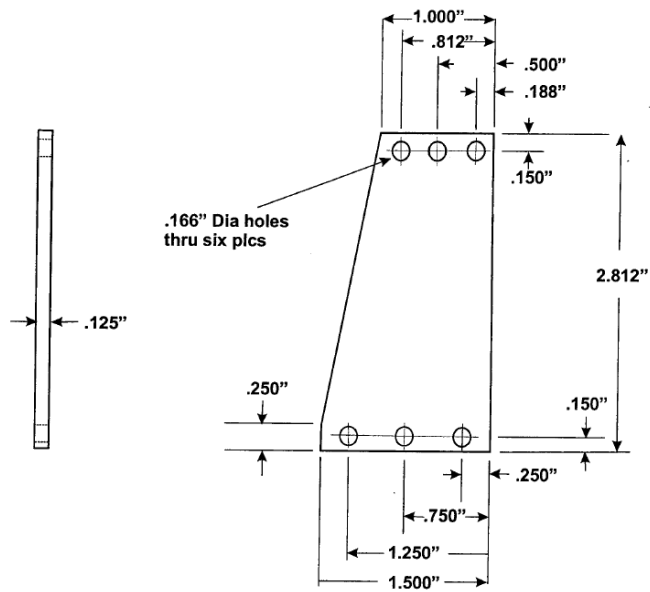
The material the tube is constructed from 6016 T6 Aluminum and exact Yield/Tensile strength could not be found, however utilizing the data for 6061 T6 Aluminum resulted in calculated strength numbers of the following

Yield Strength (stress at which a material begins to plastically deform) – 2,275 lbs

Tensile Strength (stress at which a material begins to break) – 2,559 lbs

Determination: Since these calculated numbers produce of factor of safety of at least 80 times required it is not felt that further calculations are required.

# Smokey Sam Trolley Strut



Matl: 2040 - T3 Alum

Dan Beasley  
3/26/04

Aluminum Alloy Designation	Temper	Yield Strength (1,000 lbs/sq in)	Tensile Strength (1,000 lbs/sq in)
2024	T3	50	70

Marks's Standard Handbook for Mechanical Engineers – Eighth Edition

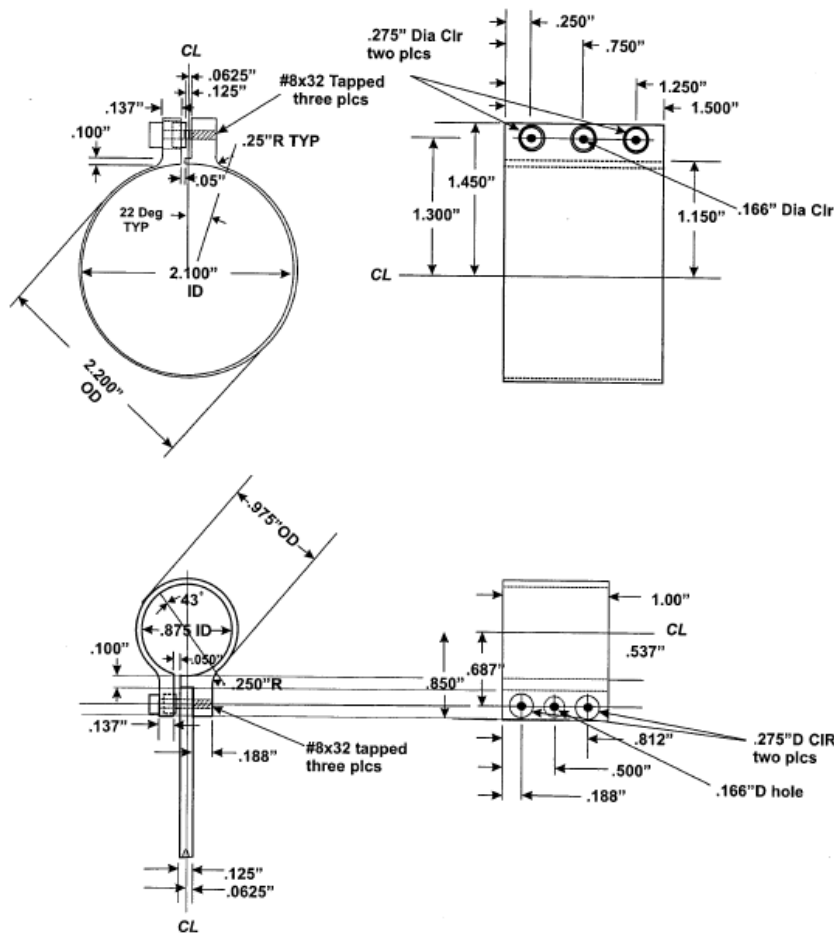
The material the tube is constructed from 2040 T3 Aluminum and exact Yield/Tensile strength could not be found, however utilizing the data for 2024 T3 Aluminum resulted in calculated strength numbers of the following

Yield Strength (stress at which a material begins to plastically deform) – 6,263 lbs

Tensile Strength (stress at which a material begins to break) – 8,768 lbs

Determination: Since these calculated numbers produce of factor of safety of at least 292 times required it is not felt that further calculations are required.

## Smokey Sam Trolley Clamps



Matri: 7075 - T65 Alum  
Dan Beasley  
3/26/04

Aluminum Alloy Designation	Temper	Yield Strength (1,000 lbs/sq in)	Tensile Strength (1,000 lbs/sq in)
7075	T65	73	83

Marks's Standard Handbook for Mechanical Engineers – Eighth Edition



### Smokey Sam Clamp

Yield Strength (stress at which a material begins to plastically deform) – 10,950 lbs

Tensile Strength (stress at which a material begins to break) – 12,450 lbs

Determination: Since these calculated numbers produce a factor of safety of at least 415 times required it is not felt that further calculations are required.

### Trolley Clamp

Yield Strength (stress at which a material begins to plastically deform) – 7,118 lbs

Tensile Strength (stress at which a material begins to break) – 8,300 lbs

Determination: Since these calculated numbers produce a factor of safety of at least 275 times required it is not felt that further calculations are required.

Clamping Bolts – the bolts utilized on the “Trolley Assembly” to attach the “Trolley Strut” to the “Trolley Clamp” to the “Trolley Tube” are #8 bolts with the following physical characteristics.

Type: #8 Steel Bolt

Threads: 32 threads / inch

Minimum Diameter (bottom of thread to bottom of opposite thread): 0.1257 inches

Cross Sectional Area: 0.01241 sq inches

Steel Strength: 50,000 lbs/sq in

Calculated Tensile Strength: 620 lbs per bolt.

Determination: For this application a minimum of two (2) bolts is required for the stability of the design resulting in a factor of safety of 40 times what is required for strength.

Reference:

Baumeister, Theodore, Marks' Standard Handbook for Mechanical Engineers  
Eight Editions, New York, McGraw-Hill Book Company, 1978.

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TO 11L1-2-23-1

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Page 4

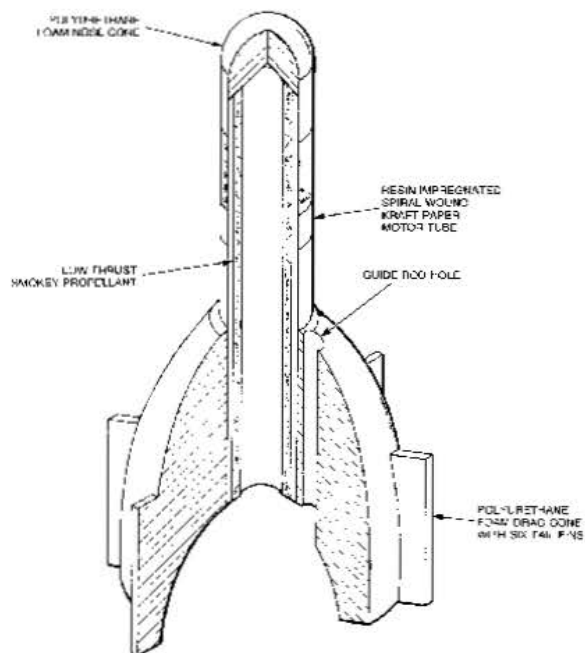


Figure 1. CTF 1RA Rocket

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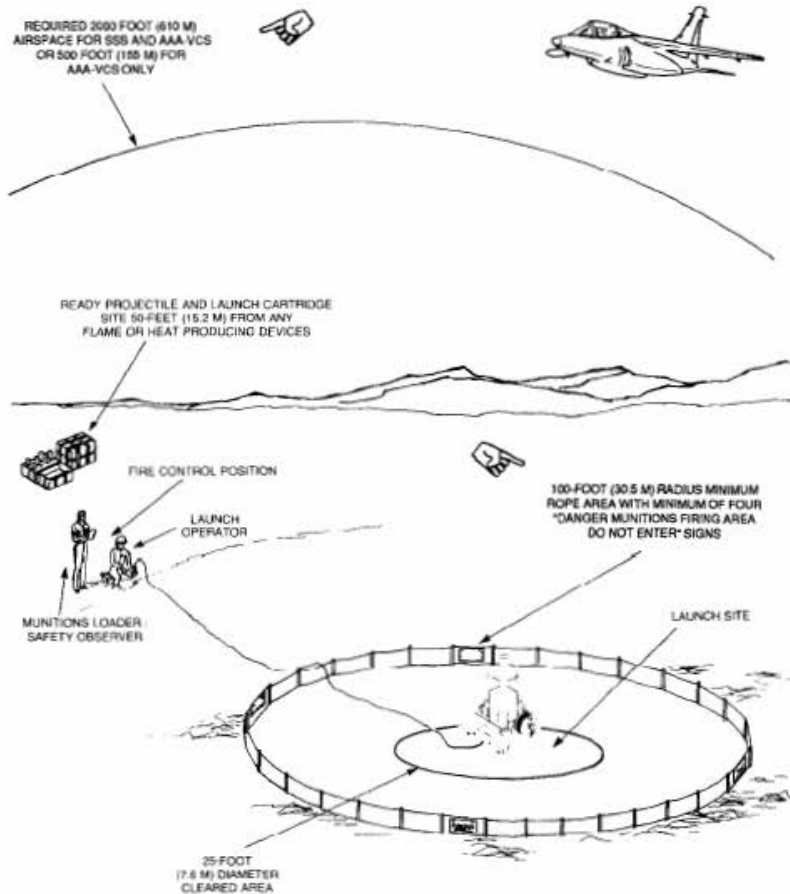


Figure 1. Launch Site (Conceptual) Preparation



DEPARTMENT OF THE NAVY  
NAVAL ORDNANCE SAFETY & SECURITY ACTIVITY  
FARRAGUT HALL BLDG D-323  
23 STRAUSS AVENUE  
INDIAN HEAD MD 20640-5555

8020HC  
Ser N821-2134/453  
20 Mar 07

From: Commanding Officer, Naval Ordnance Safety and Security Activity  
To: Commander, Indian Head Division, Naval Surface Warfare Center (E112D)

Subj: INTERIM HAZARD CLASSIFICATION FOR DEVELOPMENTAL 5% MG SMOKEY SAM ROCKET MOTOR

Ref: (a) NAVSURFWARCENDIV Indian Head ltr 8042 Ser E112D/12 of 13 Mar 07  
(b) NAVSEAINST 8020.8B  
(c) Code of Federal Regulations Title 49 Section 173.56(b)(2)  
(d) NAVSEAINST 9310.1  
(e) Code of Federal Regulations Title 49 Section 173.60  
(f) Code of Federal Regulations Title 49 Section 173.62

1. As requested by reference (a), the following interim hazard classification is assigned:

a. Nomenclature: 5% Mg Developmental Smokey Sam Rocket Motor

(1) DOD Hazard Classification: 1.3G  
(2) DOT Hazard Classification: 1.3G  
(3) DOT Label: Explosive 1.3G  
(4) UN Number: 0430  
(5) Proper Shipping Name: ARTICLES, PYROTECHNIC  
(6) Net Explosive Weight: 1.4 lb (0.64 kg)

2. This interim hazard classification expires **30 April 2008**. A copy of this letter must accompany each shipment.

3. This classification has been assigned in accordance with reference (b) as authorized by reference (c). It is granted for the shipment of explosives and ammunition on behalf of the Department of Defense (DOD). It is not applicable for shipment of materials by private contractors for non-DOD contracts. Should final hazard classification be needed for this or any other item, consult the requirements of reference (b).

4. Items that contain lithium batteries and are intended for use, storage, or transportation on Navy facilities, submarines, ships, vessels, or aircraft must be reviewed in accordance with reference (d). For additional information regarding this issue, please contact:

Subj: INTERIM HAZARD CLASSIFICATION FOR DEVELOPMENTAL 5% MG  
SMOKEY SAM ROCKET MOTOR

Mrs. Julie Banner  
Naval Surface Warfare Center, Carderock Division  
Email: julie.banner@navy.mil  
DSN 287-1853 or commercial (301) 227-1853

5. This classification does not relieve the shipper from complying with all the other hazardous material requirements of 49 CFR. This includes, but is not limited to, the packaging, electromagnetic radiation, and electrostatic requirements of references (e) and (f). For information regarding these issues, please contact the following persons:

Packaging: Mr. Robert Dress  
Naval PHST Center, Naval Surface Warfare Center  
Indian Head Division Detachment Earle  
Email: robert.dress@navy.mil  
DSN 449-2821 or commercial (732) 866-2821

Hazards of Electromagnetic Radiation to Ordnance (HERO):  
Mr. Charles Denham/Rick Magrogan  
Naval Surface Warfare Center,  
Dahlgren Division  
Email: charles.denham@navy.mil  
richard.magrogan@navy.mil  
DSN 249-3444/3445 or commercial  
(540) 653-3444/3445

Electrostatic Discharge (ESD):  
Mr. Joseph Sferrella/Robert Daily/Joseph Dulcey  
Naval Surface Warfare Center,  
Indian Head Division  
Email: IHDIVESD@navy.mil  
DSN 354-4554/4645/4172 or commercial  
(301) 744-4554/4645/4172

6. For further information or assistance regarding hazard classification, please contact Mrs. Karen Bonnin (N821) on DSN 354-6022, commercial (301) 744-6022, or email: karen.bonnin@navy.mil.



ED WALSEMAN  
By direction

Copy to:  
DDESB-PD

## **AFRL/RV OPERATING INSTRUCTION**

**BY ORDER OF THE COMMANDER  
AIR FORCE RESEARCH LABORATORY**

**RY OPERATING INSTRUCTION 91-201**

**DRAFT**

**Safety**



**WEAPONS AND EXPLOSIVE SAFETY**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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**ACCESSIBILITY:** Publications and forms are available on the RY Intranet site at  
<https://livelink.ebs.afrl.af.mil/livelink/lisapi.dll/open/RYPublicationsLibrary>

**RELEASABILITY:** There are no releasability restrictions on this publication.

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OPR: AFRL DET 1/SE (Mr. Kevin McDowell)  
Certified by: AFRL/RYO (Mr. Donald Tomlinson)

Pages: 9

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This operating instruction implements AFMAN 91-201, *Explosive Safety Standards* and AFI 91-202, *USAF Mishap Prevention Program*, as it applies to Smokey Surface to Air Missiles (SAMS) Weapons and Explosive Safety Program within Air Force Research Laboratory (AFRL) Sensors Directorate (RY). Ensure that all records created as a result of processes prescribed in this publication are maintained IAW AFMAN 37-123 (will convert to AFMAN 33-363), *Management of Records*, and disposed of IAW the Air Force Records Disposition Schedule (RDS) located at <https://afrims.amc.af.mil/>. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF IMT 847, *Recommendation for Change of Publication*; route AF IMT 847 through the appropriate functional chain of command.

**1.0. Experiment Description.** AFRL/RY fires Smokey SAM rockets that simulate the burn profile of a Man Portable Air Defense Missile (MANPAD). The Smokey SAM is secured to a 2,000 ft. steel cable stretched between launcher located at ground level at one end and an 85 ft. tower at the other end or a stationary mounted firing stand. Per AFMC-WPAFB-07-52, explosives limits are 35 pounds for Hazard Class/Division (HC/D) 1.3, and 2 pounds for HC/D 1.4. The location of the firings will be the Area B Flight Line, Wright Patterson AFB, Ohio. The use of the term SUPERVISOR within this operating instruction refers to the Field Team Leader and is for clarification of one of three positions identified in AFMAN 91-201, and as it is not to be construed as a supervisor with personnel responsibilities.

**1.1. Scope.** This firing demonstration simulates the launch and flight of a MANPAD missile observing the effectiveness of the sensor research being developed. The number

of Smokey SAM firings will be enumerated in each individual test plan which must be approved by the Safety Review Board (SRB).

**1.2. Purpose of Test.** The purpose of firing Smokey SAM rockets is to simulate a MANPAD launch for sensor evaluation. The test will consist of both the launch and fly-out of a simulated MANPAD directed at a potential airborne target. The Smokey SAM will be tethered and run along a 2,000 ft. steel cable or be solidly affixed to a stationary launch stand. The test will not present a threat to personnel or equipment located on or near the demonstration area.

**1.3.** Safety requirements and precautions will be complied with by personnel during all operations involving explosive items. All personnel engaged in operations in which an explosive item's are involved shall be thoroughly trained in explosive safety and shall be capable of recognizing hazardous explosive situations. Prompt action shall be taken to control any hazard. If an immediately dangerous explosive item is encountered, all operations in the immediate vicinity will be shut down, personnel evacuated to a safe location, and 88 CES/CED Explosive Ordinance Personnel will be called to render assistance in eliminating the hazard. Personnel will remain outside the clear-zone and all operations will not be resumed until the hazard has been eliminated.

**2.0 Schedule and Set-Up.** The demonstrations will occur at the Wright-Patterson Area B runway demonstration area. The geographical location of the cable test set-up is illustrated in **Figure 1, and will remain within the area indicated by the shading.** The launch site is where the launch platform for the cable mounted Smokey SAM will be located and is approximately 2 km from the 10th floor of the Bldg 620 tower. One rocket at a time will be mounted on the launcher. The test will commence with the firing of a Smokey SAM and conclude with the spent motor coming to rest at the tower end of the cable. During the rocket launch the observers electronically document the flight of the Smokey SAM as it progresses along the cable or the plume from the stationary launch stand.

**2.1. Set-up Procedures.** The launcher is positioned beneath a 1/8 inch diameter stainless steel cable. Because of the requirement for a mobile system, the cable will be anchored to two vehicles that will remain outside an arc at least 100 horizontal feet from any point on the cable where the Smokey SAM will travel. Step-by-step set up and pre-launch inspection procedures are included within the individual test plan. The observers will be located on the 10<sup>th</sup> floor of Building 620. Radio and telephonic communication will provide coordination between the tower and launch personnel.

**2.2.** Dates for Smokey SAM firings will be coordinated with AFRL Det 1/SES System Safety Manager (RY), AFRL Det 1/SE Ground/Weapons Safety Manager (RY), Base Safety Office, Environmental Management, Fire Department, Security Police, and 88 CE/CED who coordinate activities for areas where the demonstration will be conducted. There are certain atmospheric conditions; light rain, haze, and snow that can impede measurements and make the firing weather dependent. Backup days will be identified and coordinated with each functional area per Test Plan. Normal time of operation will be during daylight hours unless otherwise specified and approved by Safety Review Board



(SRB). One episode (8 hrs in length) is usually conducted and normally begins at 0800 hours and concludes at 1600 hours.

**3.0. Standard Operating Procedures and Responsibilities.** Duties of Test Crew are as follows:

**3.1.** Test Director will be responsible for the success of the test and has supreme authority during the test. The Test Director will ensure that participating agencies are notified of test date and time at least one day prior (see **7.0.**).

**3.1.1. Procedures in Event of Electrical Storms.** The Test Director will check local weather conditions for electrical storms. The 88th Weather Squadron website (located here: <http://weather.wpafb.af.mil/>) presents weather warnings and alerts. This website should be checked prior to firing or to be absolutely proactive with the most current data, call 257-6801 and ask if lightning is in the area before each demonstration. Launch operations will be terminated if an electrical storm approaches the near-by vicinity.

The following guidelines apply when an electrical storm is in the vicinity. An electrical storm is considered “in the vicinity” if personal observation or official weather reports locate lightning flashes within 5 nautical miles (5.75 miles) of the installation. When an electrical storm is in the vicinity, personnel can no longer remain inside the demonstration footprint or near an unprotected explosives loaded truck, holding pad, or unprotected open explosives storage pad. Locations (facilities or areas) are considered unprotected if they have no lightning protection installed. All explosives operations will stop that are outdoors or indoor locations that have no lightning protection. Whenever possible, ask the local weather unit to make an accurate assessment and arrange for weather warnings when existing or scheduled operations might create an exceptional hazard. The Test Director or Supervisor will be empowered to order evacuation when considered necessary.

**3.1.2.** Personnel will be evacuated from these locations when:

**3.1.2.1.** Explosives locations, buildings, open storage sites or loading docks without approved lightning protection systems, contain explosives.

**3.1.2.2.** Facilities containing exposed explosives, explosive dust or explosive vapor, or un-packaged electrically initiated explosive devices, even though equipped with approved lightning protection systems.

**3.1.2.3.** Parked, explosives-laden vehicles and railroad cars, not protected by an approved lightning protection system.

**3.1.2.4.** All locations are within Public Traffic Route (PTR) of facilities.

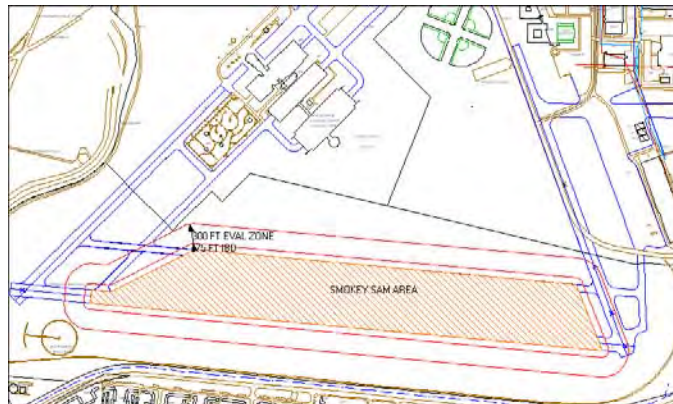
**3.1.3. Supervisor (Field Team Leader).** Supervisor is responsible for the safety of all field team members and to ensure that no unauthorized personnel, equipment, items, or vehicles are present in the rocket footprint area while demonstrations are being conducted. The rocket footprint consists of a 100 ft. area on each end, and along each side of the 2000 ft. flight path within the approved clear-zone (refer to **Figure 1**). Team Leader will ensure that all field team members comply with all procedures contained in the Test Plan, approved by the SRB. Smokey SAM explosive stocks must be located at least 100 feet from the rocket footprint area, launch point and intended flight path. Smokey SAM explosive stocks must be placed at least 75 feet inside the 300 foot explosives clear zone identified in explosives site plan AFMC-WPAFB-07-S2.

**3.1.4. Tower Team Leader.** Tower Team Leader is responsible for the safe and proper control of the observers in the tower. He will ensure that all observers comply with procedures contained herein. Note: nothing in these procedures shall preclude any field team member from issuing a stop countdown order should that team member detect the development of any condition that he/she feels may be unsafe.

### **3.2. Field Team Procedures.**

**3.2.1.** Establish communications, using Land Mobile Radios (LMR), walkie-talkies, and cell phones, between the Supervisor (Field Team Leader) and the Tower Team Leader.

**Figure 1 - Test Area Map**



**3.2.2.** Prepare the Smokey SAM test stand for operations per T.O. 11L1-2-23-1 NAVAIR 11-75-63, Smokey SAM Simulator/Anti-Aircraft Artillery Visual Cueing System.

**3.2.3.** Notify the Tower Team Leader when the Smokey SAM test stand is ready for operations.

**3.3. Supervisor (Field Team Leader).**

**3.3.1.** Ensure all warning signs (DANGER: MUNITIONS FIRING AREA DO NOT ENTER) and area boundary markers (demonstration area fence and placed cones) are placed at least 300 feet away from the test area before initiating demonstration.

**3.3.2.** Ensure that Smokey SAM assets are delivered to the demonstration site from Base Munitions Storage (OSS/OSK) by 46<sup>th</sup> Test Wing (46 OG/OGM)/46 SES.

**3.3.3.** Attach Smokey SAM to test stand and connect firing mechanism in accordance with applicable technical data in accordance with T.O. 11L1-2-23-1.

**3.3.4.** Continuously monitor the missile footprint area for unauthorized personnel.

**3.3.5.** Establish communications with the Sensors Team Leader.

**3.3.6.** Ensure all Personnel Protective Equipment (PPE) is used where required to include clothing and equipment. The use of eye protection (safety glasses) is required during loading and gloves are recommended for handling black powder.

**3.3.7.** Ensure step-by-step procedures are followed in T.O. 11L1-2-23-1 for firing Smokey SAMS. All demonstration modifications to this T.O. must be approved by 88 ABW/SEW and the SRB.

**3.3.8.** When notified by the Tower Team Leader that systems are ready, Supervisor will operate the rocket firing mechanism as directed by T.O. 11L1-2-23-1.

**3.3.9.** At the completion of the rocket motor burn, the Supervisor will communicate to the team that the demonstration has terminated.

**3.3.10.** Ensure a minimum of two serviceable fire extinguishers, suitable for the hazards involved, are available for immediate use where explosives are being handled and are provided to demonstration site. Note: do not discuss classified data and do not use key words such as laser, beam, fire, etc. or any combination thereof. Only minimum essential personnel will be allowed within 100 yards of the rocket launch platform, per test director requirements. In the event of a rocket failure to ignite, Supervisor will contact the Explosive Ordinance Detachment (EOD) to remove the rocket from the rocket launcher. The 88 CES/CED (EOD) will be contacted for support of this demonstration.

**3.4. Tower Team Procedures.**

**3.4.1.** Establish communications between the Supervisor and the Tower Team Leader.

**3.4.2.** Prepare tower electronic systems for operations.

**3.4.3.** Notify the Tower Team Leader when the Tower is ready for operations.

**3.4.4.** At least two people will be at the tower site at all times.

**3.5. Tower Team Leader.**

**3.5.1.** Verify at least two people will be at the tower site at all times.

**3.5.2.** Brief observers on safety and operational procedures.

**3.5.3.** Establish communications with the Supervisor.

**3.5.4.** When the observers are in place and ready; notify the Supervisor and the remaining tower personnel.

**3.5.5.** All personnel will acknowledge system ready.

**3.6. Casuals (Visitors).**

**3.6.1.** Casuals are defined as AFRL personnel or other personnel who are not participating in or directly involved with the experiment being conducted.

**3.6.2.** Casuals will be verbally briefed on what they will witness and specifically briefed on all potential dangers.

**3.6.3.** Casuals will sign a log sheet acknowledging that they were given the safety briefing.

**3.6.4.** Casuals will be subject to the same regulations and Standard Operating Procedures (SOPs) as test personnel, where applicable.

**3.7. Personnel Limits.**

**3.7.1.** Two fully trained and knowledgeable explosive operators, of which one must be the Supervisor, is the minimum number of personnel required for firing demonstration. Clearly post personnel limits for the operations being conducted. Each Test Plan will distinguish/specify individuals designated as Supervisor, workers, and area where any casuals (visitors) will be located. Each test plan will identify the maximum numbers of Supervisors, Workers, and Casuals; however

the following personnel limits will never be exceeded. **Supervisor: 1, Workers: 4, Casuals: 4**

**3.7.2.** Casuals must remain 300 ft. behind the rocket launcher.

**3.7.3.** Workers must remain a minimum of 100 ft. behind the rocket launcher per T.O. 11.L1-2-23-1 and Supervisors direction.

**3.7.4.** The number of casuals will be strictly controlled.

### **3.8. Safety Misfire Requirements.**

**3.8.1.** In the event of a rocket misfire, all personnel remain clear (100 ft.) of the rocket launcher for 30 minutes or as determined by the senior EOD technician per T.O. 11.L1-2-23-1. The EOD technician need not be on site but notified. EOD specific support must be detailed in each Test Plan.

**3.8.2.** EOD will require coordination before any firings, and must be part of the Test Plan.

**4.0. Hazard Analysis.** Documented hazards are listed on the AFRL Form 5, *System Safety Permit* and AFRL Form 12, *Test Hazard Analysis* (THA). THA will be included as part of each Test Plan and be assessed during the SRB, which is conducted before each firing. Severity, probability and risk analysis will be identified and operational risk approval for this research effort coordinated by applicable Test Authority Approval (TAA) per AFRLI 99-103. *AFRL Test Program*, A LOW risk assessment requires Division Chief Certification prior to testing.

### **4.1. Tower Observation Sites.**

**4.1.1.** Cameras will be rigidly mounted to a heavy duty mount which is massive and heavy enough to prevent accidental motion bumping the equipment. All electronics will be enclosed and grounded. The access doors will be locked at all times.

**4.1.2.** Announcements and other warning measures (warning lights, markers, etc) will be provided during periods of operations. The Supervisor and Tower Team Leader will be responsible for their respective demonstration area safety. This includes a communications network between all adjacent areas to prevent the inadvertent entry of unauthorized personnel.

### **5.0. Environmental Impact Analysis.**

**5.1.** The AF Form 813, *Environmental Impact Analysis Request* will be coordinated and updated as required. An AF Form 813 will be attached to each Test Plan.

**6.0. Emergency Operating Procedures.**

**6.1. Unspent Pyrotechnic Propellant.** Unspent propellant (black powder) determined by visual inspection and or distance traveled by Smokey SAM.

**6.1.1.** Notify EOD immediately.

**6.1.2.** Notify Fire department.

**6.1.3.** Do not handle material.

**6.1.4.** Cordon off area, 100 ft. around launcher using cones and launch personnel, and await EOD

**6.2. Injury.** Test Plans will include the following in the event any personnel should be injured during the test.

**6.2.1.** Obtain medical treatment immediately.

**6.2.2.** Contact MED CEN/SGB, 911.

**6.2.3.** Obtain information about accident.

**6.2.4.** Use AFRL Form 29, *Test Safety Mishap Workshop Form* for reporting.

**6.2.5. In Building 620 Tower.**

**6.2.5.1.** Electrical Power kill switch is located on stairwell wall.

**6.2.5.2.** Fire use telephone to call Fire Department at number 911.

**6.2.5.3.** Injury use telephone to call ambulance at number 911.

**6.2.6. Wright Field Runway.**

**6.2.6.1.** In case of Fire, Accident or Injury use the communication network to relay information to the Bldg 620 Tower Team Leader. For cell phone emergency calls use 937-257-1454. Note: first aid kits are available for Bldg 620 tower and a portable kit is available for field use.

**7.0. Test Notification List.**

**7.1.** Base Security - 257-6516

**7.2.** Base Fire Department - 257-3033 (Prior to and at conclusion)



**7.3.** AFRL/RV Command Center - 656-9501

**7.4.** AFRL/RVJW - 255-4174 x4021

**7.5.** 88<sup>th</sup> ABW/EM - 257-2010

**7.6.** Air Force Museum - 255-8046 x311

**7.7.** WPAFB Tower - 257-1713

**7.8.** 88 CES/CED (EOD) – 257-5290

**7.9** Other Important Phone Numbers

**7.9.1.** AFRL Det 1/SE Explosives /Weapons Unit Safety Representative - 904-9734

**7.9.2.** 88 ABW/SEW - 904-0888

**7.9.3.** Base Police 257-6516 (24 hrs)

**7.9.4.** Bldg 620 Tower, 10th Floor - 255-4174 x3327

**7.9.5.** All emergencies - 911 (cell phone use 257-7911)

**8.0. Prescribed and Adopted Forms.**

**8.1. Prescribed Forms:**

None.

**8.2 Adopted Forms:**

AF Form 813, *Environmental Impact Request*, AF Form 1003, *Air Force Core Personnel Document*, AF IMT Form 1768, *Staff Summary Sheet*, AFRL Form 5, *System Safety Permit*, AFRL Form 12, *Test Hazard Analysis*, AFRL Form 29, *Test Safety Mishap Workshop*

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